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| 4200CIV  Semester 1  *Civil engineering* | ENGINEERING MATHEMATICS  (20c) | *Aim:*  To develop knowledge and understanding of the mathematics underpinning engineering, and to apply these techniques within an engineering context. | *Learning activities:*  A combination of lectures, tutorials and computer laboratories. The laboratories will  enable students to use and apply mathematical software to the solution of  engineering mathematics problems. | *Assessment:*  IN-CLASS TEST (30%) EXAMINATION (70%) |
| 4202CIV  Semester 1  *Civil engineering* | INFRASTRUCTURE  (10c) | *Aim:*  To introduce students to infrastructure and to explain the interlinking between the various forms of infrastructure.  To introduce the students to a systems approach to solving complex engineering problems.  To introduce the planning, design, construction and operational activities required for civil engineering infrastructure & associated works. | *Learning activities:*  Lectures, IT workshops, tutorials. | *Assessment:*  EXAMINATION (100%) |
| 4204CIV  Semester 1  *Civil engineering* | INTRODUCTION TO GEOTECHNICS  (20c) | *Aim:*  To gain an entry level understanding of soil and rock mechanics and soil interaction in engineering applications. | *Learning activities:*  Lectures/Tutorials/Practicals. | *Assessment:*  LABORATORY REPORT (30%) EXAMINATION (70%) |
| 5200CIV  Semester 1  *Civil engineering* | MATERIALS  (20c) | *Aim:*  To introduce the students to a range of advanced materials, and to a more fundamental understanding of how their micro- and mesoscale structures determine their macroscale properties.  To explore how effects such as electrical, thermal and acoustic conduction are mediated through a range of materials, and how careful selection of such materials can control and guide these effects.  To understand how and why the treatment and environment to which a material is exposed can alter its properties and working life, e.g. fire, salt water, thermal cycling.  To understand how photovoltaic and solar thermal power are generated and why combining the two is a challenge; to understand suitable locations for photovoltaic panels in buildings. | *Learning activities:*  Lectures will be delivered throughout a semester-long programme, incorporating slides, videos and in-lecture quizzes. These theory sessions will be provided alongside extensive hands-on laboratory sessions to both demonstrate the phenomena described but also to extend student experience of a range of analytical techniques and physical principles. | *Assessment:*  JOURNAL STYLE LAB REPORT (25%) EXAMINATION (75%) |
| 5201CIV  Semester 1  *Civil engineering* | SURVEYING, HIGHWAYS AND TRANSPORTATION  (20c) | *Aim:*  To introduce methods of infrastructure route planning.  To introduce highway geometry, design & construction.  To introduce geodetic and satellite surveying.  To demonstrate how total stations and GNSS receivers, can capture data for use in software packages to produce contoured plans and sections.  To develop practical surveying skills | *Learning activities:*  Lectures, computational problems, practical use of surveying instruments in the field, treatment of field data and subsequent production of site drawings in IT workshops. | *Assessment:*  SURVEYING FIELD COURSE (40%) EXAMINATION (60%) |
| 5205CIV  Semester 1  *Civil engineering* | STRUCTURAL ANALYSIS AND DESIGN  (20c) | *Aim:*  To introduce the analysis of statically indeterminate structures and the analysis of the plastic behaviour of steel structures.  To design and detail structural elements in reinforced concrete and structural steelwork using Eurocode 2 and 3.  Introduce students to the use of software for the analysis and design of structures. | *Learning activities:*  Lectures, tutorials, problem-solving sessions, laboratory practical work, use of specialist computer software. | *Assessment:*  EXAMINATION (70%) ANALYSIS & DESIGN REPORT (30%) |
| 6200CIV  Semester 1  *Civil engineering* | ADVANCED MATERIALS, RIVER AND COASTAL ENGINEERING  (20c) | *Aim:*  To further develop the student's understanding of the behaviour of engineering materials under a wide range of service conditions in consideration of durability and sustainability and to critically review the choice of materials for specific river and coastal applications.  This module develops an understanding of river and coastal engineering. It examines river and coastal engineering works, in particular flood defence works and the materials used for them. | *Learning activities:*  Lectures, workshops and practical sessions. | *Assessment:*  REPORT <2000 WORDS (30%) EXAMINATION (70%) |
| 6201CIV  Semester 1  *Civil engineering* | INFRASTRUCTURE, HIGHWAYS DESIGN AND INNOVATION  (20c) | *Aim:*  To develop understanding and knowledge of the role of infrastructure in supporting society, and the role of civil engineering in developing infrastructure. In particular students will develop further understanding of the design of roads and highway drainage.  The module will study recent developments within the field of infrastructure, and students will develop an understanding of innovation and entrepreneurship through consideration of case studies. | *Learning activities:*  Lectures, workshops, and seminars | *Assessment:*  EXAMINATION (70%) INNOVATION REPORT <2000 WORDS (30%) |
| 7006BEPG  Semester 1  *Civil engineering* | WATER AND WASTEWATER TREATMENT  (20c) | *Aim:*  To critically appraise current practice in the treatment of water and wastewater.  To develop an understanding of the characteristics of wastewaters, and associated sludges, and the selection, process design and operation of treatment works to meet discharge standards.  To contextualise water and wastewater treatment within the overall management of public water supply and sanitation. | *Learning activities:*  Lectures, seminars and field visits. | *Assessment:*  EXAM (60%) ESSAY (40%) |
| 7204CIV  Semester 1  *Civil engineering* | APPLIED FINITE ELEMENT ANALYSIS  (20c) | *Aim:*  The module will introduce students to the finite element method and explore the underlying theory of finite element methods.  Students will investigate the performance and reliability of finite element methods in civil engineering applications, such as structural problems including material nonlinearity.  Whilst the theoretical aspects of the method will be covered in lectures the module is intended to be practical in nature with students having the opportunity to practice via a range of tutorials and assignments using industry standard software. | *Learning activities:*  Lectures, tutorials, computational problems, practical use of commercial finite element analysis packages for analysis of structures. | *Assessment:*  EXAMINATION (80%) FINITE ELEMENT SOFTWARE REPORT (20%) |
| 7205CIV  Semester 1  *Civil engineering* | PAVEMENT, HIGHWAYS AND TRANSPORT ENGINEERING  (20c) | *Aim:*  To develop understanding and critical evaluation in highway and road pavement design.  To appreciate the demands and challenges in providing and maintaining sustainable road transport infrastructure.  To develop understanding of traffic flow theory, transport planning and associated social and environmental elements such as road safety and air pollution. | *Learning activities:*  Lectures, tutorials, and workshops | *Assessment:*  EXAMINATION (60%) REPORT <2000 WORDS (40%) |
| 7307BEPG  Semester 1  *Civil engineering* | Sustainable Infrastructure  (20c) | *Aim:*  To develop understanding of the operation, design and management of infrastructure in both the Developing World and the Developed World. From this students will develop the capability for critical assessment of the sustainability of infrastructure in a wide variety of situations. | *Learning activities:*  Lectures and seminars. The assessment is an integral part of the learning process. | *Assessment:*  EXAM (60%) PORTFOLIO (40%) |
| 7327BEPG  Semester 1  *Civil engineering* | ENERGY MANAGEMENT  (20c) | *Aim:*  To provide the necessary skills for the selection and the effective management of energy in the construction industry, business environment and the energy supply sector. | *Learning activities:*  Lectures, tutorials and practicals. | *Assessment:*  EXAM (60%) PORTFOLIO (40%) |
| 4201CIV  Semester 2  *Civil engineering* | STRUCTURES AND MATERIALS  (20c) | *Aim:*  To introduce structural mechanics and provide an understanding of the basic concepts and techniques, with emphasis on the application of these to the solution of statically determinate structures.  To apply mathematical and geometrical calculations to the determination of structural properties of sections.  To examine and explore the structural behaviour of materials, the relationship between ultimate stress and working stress and the likely modes of failure and hence provide a sound rationale for selection and use of materials in engineering. | *Learning activities:*  Lectures, tutorials and laboratory practicals. | *Assessment:*  LABORATORY BASED <2000 WORDS (30%) EXAMINATION (70%) |
| 4203CIV  Semester 2  *Civil engineering* | SURVEYING AND CAD  (20c) | *Aim:*  To provide an introduction to basic techniques for land surveying and setting out. It includes methods of obtaining field measurements for the purpose of producing site drawings, and setting out points using line-of sight.  To develop an understanding of the use and application of Computer Aided Design in the Built Environment and the development of 2-dimensional drafting techniques and conventions. | *Learning activities:*  Surveying will be taught through lectures and tutorial exercises. Practical sessions will provide hands on experience with surveying equipment. IT workshops will introduce students to CAD and how survey measurements are applied in civil engineering drawings. | *Assessment:*  SURVEYING AND CAD DRAWINGS (50%) EXAMINATION (50%) |
| 4205CIV  Semester 2  *Civil engineering* | HYDRAULICS  (10c) | *Aim:*  To introduce and then consolidate students’ knowledge to the concepts, theory and application of fluid mechanics and establish their relevance in civil engineering.  To demonstrate and explore key hydraulic phenomena through experimentation.  To study engineering design principles of pipe networks. | *Learning activities:*  Lectures, tutorials and laboratory practicals. | *Assessment:*  LABORATORY BASED (100%) |
| 5202CIV  Semester 2  *Civil engineering* | APPLIED MATHEMATICS  (10c) | *Aim:*  To develop knowledge and understanding of the probability theory and statistics underpinning engineering, and to apply these techniques within an engineering context.  To further develop the knowledge and understanding of relevant mathematical techniques underpinning engineering, and to apply these within an engineering context. | *Learning activities:*  A combination of lectures and tutorials. | *Assessment:*  EXAMINATION (100%) |
| 5203CIV  Semester 2  *Civil engineering* | GEOTECHNICS  (10c) | *Aim:*  To gain an advanced understanding of soil mechanics in engineering applications, and to apply this to the design of foundations and methods for slope stabilisation. | *Learning activities:*  Lectures/Tutorials/Practicals. | *Assessment:*  EXAMINATION (100%) |
| 5204CIV  Semester 2  *Civil engineering* | WATER ENGINEERING  (20c) | *Aim:*  To introduce and then consolidate students’ knowledge of the principles of engineering hydrology applied to civil engineering problems.  To provide students with the ability to perform and assess a range of hydraulic computations relating to open channel flow commonly used in civil engineering.  To provide an introduction to the basic unit processes and operations used in conventional water and wastewater treatment. | *Learning activities:*  Lectures, tutorials and practicals | *Assessment:*  EXAMINATION (70%) REPORT (30%) |
| 5206CIV  Semester 2  *Civil engineering* | CIVIL ENGINEERING PROJECT  (20c) | *Aim:*  1. To enable the student to develop the academic and digital literacy skills necessary to perform effectively in a Higher Education context  2. To develop students’ understanding of their professional subject area, and their skills in team work in a collaborative environment using industry standard collaborative CAD and design tools.  3. To develop student’s self awareness skills, and their personal development planning through CPD  4. To develop students understanding of Risk Management, Health and Safety and sustainability | *Learning activities:*  Lectures, workshops, including group work and presentations  Group work is a key theme of the module; the intention being to simulate the experience of the work place and work place activity, endorsed by the involvement of employers and stakeholders as relevant to the workplace generally. | *Assessment:*  REPORT ON GROUP DESIGN PROJECT (50%) CPD PORTFOLIO (50%) |
| 5207CIV  Semester 2  *Civil engineering* | WORK BASED LEARNING  (20c) | *Aim:*  This module develops student knowledge and understanding of the Civil Engineering Profession by making use of the opportunities available within the workplace. | *Learning activities:*  Most learning takes place in the workplace, supplemented by lectures and seminar sessions. | *Assessment:*  REPORT (<2000 WORDS) (50%) CPD PORTFOLIO (50%) |
| 6202CIV  Semester 2  *Civil engineering* | ADVANCED GEOTECHNICS AND DESIGN  (20c) | *Aim:*  To gain an advanced level of design skill in complex geotechnical applications. | *Learning activities:*  Lectures and Tutorial sessions. | *Assessment:*  DESIGN REPORT (30%) EXAMINATION (70%) |
| 6203CIV  Semester 2  *Civil engineering* | STRUCTURAL DESIGN AND RISK MANAGEMENT  (20c) | *Aim:*  This module is designed to give students an up-to-date knowledge of the structural design of structural members made from a variety of materials. Alongside the structural design they will develop their understanding of Risk Assessment and the associated Risk Management within a construction project environment. Students will develop and consolidate the structural application, design, evaluation and analysis introduced at Level 4 and 5 with more advanced application to, in particular, concrete, steel, masonry building elements/structures, using the current codes of practice including the Eurocodes. | *Learning activities:*  Lectures, workshops and Tutorial sessions. | *Assessment:*  EXAMINATION (70%) GROUP STRUCTURAL DESIGN & RISK (30%) |
| 7001BEPG  Semester 2  *Civil engineering* | RESEARCH METHODOLOGY  (10c) | *Aim:*  To provide an understanding of the academic research process understanding the differing techniques, strategies and methods used to undertake research in the built environment. | *Learning activities:*  Lectures and seminars. | *Assessment:*  REPORT (50%) REPORT (50%) |
| 7008BEPG  Semester 2  *Civil engineering* | ENVIRONMENT SYSTEMS  (20c) | *Aim:*  To develop an understanding of environmental systems and ways in which human activity can effect them. To develop knowledge and understanding of the workings of environmental systems, in particular: ecosystems, resources and human impact on the environment, and to enable the student to make justified technical and management decisions in the light of this knowledge and understanding. | *Learning activities:*  Lectures and seminars. | *Assessment:*  EXAM (60%) REPORT (40%) |
| 7200CIV  Semester 2  *Civil engineering* | CIVIL ENGINEERING PROFESSIONAL PRACTICE  (20c) | *Aim:*  The module will work with students on the development of their professional portfolio, within the context of master’s level design and evaluative skills development.  Students will develop systems approach to the solution of complex problems, and evaluate sustainability of designs. They will work from this to further development of their Civil Engineering ‘attainments’. | *Learning activities:*  Lectures, seminars | *Assessment:*  REPORT (<2000 WORDS) (40%) PORTFOLIO (60%) |
| 7201CIV  Semester 2  *Civil engineering* | WORK BASED LEARNING INNOVATION  (20c) | *Aim:*  This module develops student knowledge and understanding of the Civil Engineering Profession by making use of the opportunities available within the workplace. The module will work with students on the development of their professional portfolio, within the context of master’s level design and evaluative skills development.  Students will develop systems approach to the solution of complex problems, and evaluate sustainability of designs. They will work from this to further development of their Civil Engineering ‘attainments’. | *Learning activities:*  Most learning takes place in the workplace, supplemented by lectures and seminar sessions. | *Assessment:*  REPORT (<2000 WORDS) (40%) PORTFOLIO (60%) |
| 7203CIV  Semester 2  *Civil engineering* | ANALYSIS AND DESIGN OF LARGE STRUCTURES  (20c) | *Aim:*  This module aims to:  • Appreciate the underlying differences in the behaviour and analysis of steel, prestressed concrete and tensile structures.  • Develop understanding of the philosophies of current professional Codes of Practice, and to gain competence in using appropriate methods for the design of steel, prestressed concrete and tensile structures  • Instil confidence in the proper design of large span elements in steel, pre-stress concrete and cable tensile structural elements and  • Develop understanding of large span steel, pre-stress concrete and tensile structures | *Learning activities:*  Module contents are conducted primarily through traditional lectures with audio-visual aids, handouts, visiting industrial lecturers and an extensive design-based-on-going project of course material. The lectured material provides the theoretical basis for the principles of analysis and design covered in the syllabus. Learning is achieved primarily through the lecture, tutorial and practical design case studies/examples, where individual supervision is provided. Support is also provided through electronic contact. | *Assessment:*  REAL PRACTICAL DESIGN STUDY (30%) OPEN BOOK EXAMINATION (70%) |
| 7206CIV  Semester 2  *Civil engineering* | DESIGN AND CONSTRUCTION OF TRANSPORT INFRASTRUCTURE  (20c) | *Aim:*  The module will enable students to design and manage transport infrastructure, including rail, airports, ports, roads and road drainage.  Students will develop evaluative skills with regard to choice of transport infrastructure and construction management, and be able to design integrated transport systems. | *Learning activities:*  Lectures, tutorials, Field assessment of transport. | *Assessment:*  EXAMINATION (60%) TRANSPORT DESIGN <2000 WORDS (40%) |
| 7303BEPG  Semester 2  *Civil engineering* | PRINCE2®  (10c) | *Aim:*  To develop the requisite skills and knowledge needed in order to apply the PRINCE2® method to the management of different stages of the project life cycle. | *Learning activities:*  The module is delivered in taught mode by lectures, workshops, seminars, using case studies, interactive group work and directed self-study. | *Assessment:*  portfolio (100%) |
| 7313BEPG  Semester 2  *Civil engineering* | COLLABORATIVE BIM PROJECT  (20c) | *Aim:*  To allow students to follow BIM protocols and practice in a collaborative multidisciplinary project team to achieve project success. | *Learning activities:*  The central theme of the module is the production of a suitable work derived project and it is supported by the other modules within the programme.  Group work is a key theme of the module; the intention being to simulate the experience of the work place and work place activity, endorsed and approved by the involvement of the various stakeholders as relevant to the workplace generally.  Key skills are developed through lectures and seminars which include individual and group presentations. | *Assessment:*  PORTFOLIO (100%) |
| 7325BEPG  Semester 2  *Civil engineering* | River Basin Management  (10c) | *Aim:*  To provide a thorough grounding in river basin management within the context of the EU Water Framework Directive (WFD).  To explore the WFD, the development of monitoring programmes within water bodies, the 'programmes of measures' for them and River Basin management Plans.  To consider the sustainable use of water and critically evaluate developments in measures for sustainable use.  To explore current developments in pollution control and the determination of consents for the discharge of polluted water and water impoundment. | *Learning activities:*  Lectures and seminars | *Assessment:*  EXAM (100%) |
| 7326BEPG  Semester 2  *Civil engineering* | STRUCTURAL AND EARTHQUAKE ENGINEERING  (20c) | *Aim:*  The aim of this module is to introduce students to the design of structures under dynamic loading conditions. Students will gain an understanding of earthquake generation and the quantification of earthquake effects. Students will gain a knowledge of the behavior of materials, structural elements and composite structures under earthquake loading. | *Learning activities:*  Lectures, tutorials, practicals, workshops | *Assessment:*  REPORT (30%) EXAMINATION (70%) |
| 4206CIV  Yearlong  *Civil engineering* | DESIGN AND SKILLS PROJECT  (20c) | *Aim:*  1. To enable the student to develop the academic and digital literacy skills necessary to perform effectively in a Higher Education context  2. To introduce students to their professional subject area whilst providing them with an early opportunity to engage in a collaborative environment.  3. To develop student’s self awareness skills and introduce them to CPD and personal development planning. | *Learning activities:*  Lectures, workshops, including group work and presentations  Group work is a key theme of the module; the intention being to simulate the experience of the work place and work place activity, endorsed by the involvement of employers and stakeholders as relevant to the workplace generally. | *Assessment:*  CPD PORTFOLIO (30%) SELF-AWARENESS STATEMENT (10%) GROUP DESIGN <2500 WORDS (60%) |
| 6205CIV  Yearlong  *Civil engineering* | RESEARCH PROJECT  (40c) | *Aim:*  To enable students to complete a substantial piece of individual work and build on their expertise in their degree specialism.  To develop students research, time management, presentation and written communication skills. | *Learning activities:*  Individual study and investigation, supported by nominated Supervisor; lectures; workshops. | *Assessment:*  PROGRESS PRESENTATION (10%) PROPOSAL (5%) DISSERTATION 8000 WORDS (85%) |